

REMARKS

Claims 1 through 26 are now presented for examination. 1-3, 6, 7, 10-13, 17, 18, 20 and 21 have been amended to define still more clearly what Applicant regard as his invention, in terms which distinguish over the art of record. Claims 1-3, 17, 18, 20 and 21 are the only independent claims.

Claims 2-5, 8, 9, 11, 12 and 18 have been indicated as containing allowable subject and would be allowed if rewritten in independent form to include the recitations of their base and intervening claims. Accordingly, Claims 2 and 3 have been rewritten in independent form including the recitations of base Claim 1 and Claim 18 has been rewritten in independent form including the recitations of base Claim 17. In view of the changes to Claims 2, 3 and 18, it is believed that Claims 2-5, 8, 9, 11, 12 and 18 are allowable.

Claim 20 has been rejected under 35 U.S.C. § 102 as being anticipated by Japanese patent document number 61-290231 (Katsuhiko). Claim 25 depending from Claim 20 has been rejected under 35 U.S.C. § 103 as being unpatentable over the Katsuhiko document in view of U.S. Patent No. 6,184,596 to Ohzeki. With regard to the claims as currently amended, these rejections are respectfully traversed.

Independent Claim 20 as currently amended is directed to stage apparatus in which a guide is provided with a surface including a magnetic body. A moving body moves along the surface and a gas bearing supports the moving body with respect to the surface. A magnet supplied to the moving body produces a magnetic attractive force with the magnetic body. The surface of the guide has edges that define its size in the width direction orthogonal to the traveling direction of the moving body to limit movement of the moving body in the width direction using

the magnetic attractive force of the magnet in the direction parallel to the surface and to apply pre-pressure to the gas bearing.

In Applicant's view, Katsuhiko discloses a static pressure guide bearing in which the bearing surface of a saddle type movable member is carried on a guide rail without contact through a static pressure bearing and the receiving face of a facing guide rail in an approaching direction through magnetic attracting units. In the guide bearing, a permanent magnet is buried in the bearing face of a movable member while facing a magnetic member buried in the receiving face of a guide rail. The bearing face of the movable member and the receiving face of the guide rail are attracted to each other.

According to the invention defined in Claim 20 as currently amended, the surface of the guide has edges to define its size in the width direction orthogonal to the traveling direction of the moving body to limit movement of the moving body in the width direction. Advantageously, the bearing assembly of a stage apparatus is provided in which displacement in a directional orthogonal to the travel direction is limited without the need for direct-acting guides.

Katsuhiko may disclose a stage apparatus in which a magnet is supplied to limit the movement of a moving body on a guide in a direction orthogonal to its traveling direction and to apply pre-pressure to a gas bearing support for the moving body on the surface of the guide. In contrast to the guide surface with edges that define its width for limiting moving body movement in the width direction of Claim 20, Katsuhiko is restricted to a saddle type moving body on a rectangular cross-section guide devoid of edge structure such as grooves or protrusions. Accordingly it is not seen that Katsuhiko teaches or suggests a guide surface having edges that define its width (orthogonal to a moving body traveling direction) to limit movement of the moving body on the guide surface in the width direction using the attractive force of a magnet

supplied to the moving body. It is therefore believed that Claim 20 as currently amended is completely distinguished from Katsuhiko and is allowable.

Claim 1, 6, 7, 10, 13-17, 19, 21-24 and 26 have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,266,133 (Miyajima et al. '133) in view of the Katsuhiko document. With regard to the claims as currently amended, this rejection is respectfully traversed.

Independent Claim 1 as currently amended is directed to a bearing assembly. In the bearing assembly, a guide has a top surface provided with a guide surface including a magnetic body. A moving body moves along the guide surface. A first movable guide moves along the guide surface and moves the moving body in a first direction. A second movable guide moves along the guide surface and moves the moving body in a second direction orthogonal to the first direction. A bearing is provided on a portion of the first and second movable guides that opposes the guide surface. A magnet which has an opposing surface that opposes the guide surface is provided on the first and second movable guides to apply a magnetic attractive force between the first and second movable guides and the guide surface. The guide surface has edges defining the size of the guide surface in the width direction orthogonal to the traveling direction of each of the first and second movable guides to limit displacement of the first and second movable guides in the width direction to an allowable range using the magnetic attractive force of the magnet in the direction parallel to the guide surface.

Independent Claim 17 as currently amended is directed to stage apparatus in which a guide is provided with a surface including a magnetic body. A moving body is movable along the surface in a first direction and a second direction. A first movable guide moves in the second direction, moves the moving body in the second direction and guides the moving body in the first direction. A second movable guide moves in the first direction, moves the moves the moving

body in the first direction and guides the moving body in the second direction. Magnets placed in the first and second movable guides produce magnetic attractive forces with the magnetic body. The surface of the guide has edges defining its size in the width direction orthogonal to the traveling direction of each of the first and second moving guides so that movement of the first movable guide in the first direction is limited by the magnetic attractive force and movement of the second movable guide in the second direction is limited by the magnetic attractive force using the magnetic attractive force of the magnets in the direction parallel to the surface.

Miyajima et al. '133, in Applicant's view, discloses a stage device that includes a movable body, movable along a guide surface, for moving an element mounted on the movable body. A static pressure bearing that has at least one pad guides the movable body along the guide surface. At least one pad is attached to the movable body at a first position, and a linear motor, having a movable part and a relatively stationary part, moves the movable body. The movable part of the linear motor is attached to the movable body at a second position. The movable body has a hollow structure at least one of the first position and the second position. The hollow structure has an enclosure structure or a rib structure.

It is a feature of Claims 1 and 17 as currently amended that the surface of a guide of a bearing assembly or stage apparatus has a surface that includes a magnetic body and has edges defining its size in the width direction orthogonal to the traveling direction of first and second moving guides which guide a moving body in first and second directions. Each of the first and second moving guides has a magnet that produces magnetic attractive forces. In Claim 1, the edges limit displacement of first and second movable guides in the width direction to an allowable range using the magnetic attractive of the magnet in the direction parallel to the guide surface. In Claim 17, the edges are arranged so that movement of the first movable guide in the first direction

is limited by the magnetic attractive force and movement of the second movable guide in the second direction is limited by the magnetic attractive force using the magnetic of the magnets in the direction parallel to the surface.

Miyajima et al. may disclose with respect to Fig. 1 a the wafer stage device 100 that has a stationary base 1, a relatively stationary part 2 of a Y-linear motor for driving in the Y-direction, a Y-guide 3 for guiding longitudinally along the Y-direction, a Y-stage 4 for moving in the Y-direction, a relatively stationary part 5 of an X-linear motor for driving in the X-direction, an X-guide 6 for guiding longitudinally along the X-direction, and an X-stage 7 for moving in the X-direction. The stationary part 5 and the X-guide 6 are provided integrally with the Y-stage 4 so that the X-stage 7 is able to move in both the X-direction and the Y-direction. The Miyajima et al. structure, however, does not teach or suggest that a guide surface with edges defining its size in the width direction orthogonal to the traveling direction of X and Y guides and magnets in movable guides and a guide surface.

As discussed with respect to Claim 20, Katsuhiko only teaches a saddle type movable member on a rectangular guide but fails to teach or suggest a guide with a surface having edges defining its size in the width direction. Neither Miyajima et al. nor Katsuhiko teach any arrangement in which such edges on a guide surface are arranged so that movement of the first movable guide in the first direction is limited by the magnetic attractive force and movement of the second movable guide in the second direction is limited by the magnetic attractive force using the magnetic of the magnets in the direction parallel to the surface or that such edges limit displacement of first and second movable guides in the width direction to an allowable range using the magnetic attractive of the magnet in the direction parallel to the guide surface as in Claims 1 and 17. Accordingly, it is not seen that the addition of Katsuhiko's magnets in a

movable body and a guide devoid of the guide having a surface with edges defining its size for limiting movement of movable guides by magnetic attractive force to Miyajima et al.'s wafer stage with X and Y guides but without any suggestion of a guide surface with edges defining its size in the width direction orthogonal to the traveling direction of X and Y guides could possibly suggest the features of Claims 1 and 17. It is therefore believed that Claims 1 and 17 as currently amended are completely distinguished from any combination of Miyajima et al. and Katsuhiko and are allowable.

Independent Claim 21 as currently amended is directed to stage apparatus in which a moving body moves along a surface of a guide in X and Y directions. A magnet supplied to the moving body produces a magnetic attractive force. The surface of the guide has edges to define its size in the X and Y directions to limit movement of the moving body so that the moving body does not go beyond predetermined strokes in the X and Y directions.

It is a feature of Claim 21 that a guide surface has edges defining its size in the X and Y directions which edges limit movement of a moving body that is movable along the surface so that the moving body does not go beyond predetermined strokes in the X and Y directions. As discussed with respect to Claims 1 and 17, neither Miyajima et al. nor Katsuhiko in any manner teaches or suggests a guide structure with edges on the guide surface that define its width and limit the movement of a movable body on the guide surface. As a result, it is not seen that the addition of Katsuhiko's magnets on a movable body and a guide to Miyajima et al.'s stage configuration could possibly suggest the features of Claim 21. It is therefore believed that Claim 21 as currently amended is completely distinguished from any combination of Miyajima et al. and Katsuhiko and are allowable.

For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 1-3, 17, 18, 20 and 21, is patentably defined over the cited art.

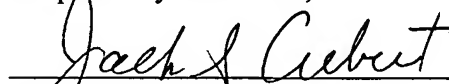
Dependent claims 4-16, 19 and 22-26 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that this Amendment After Final Rejection clearly places this application in condition for allowance. This Amendment was not earlier presented because Applicants believed that the prior Amendment placed the application in condition for allowance. Accordingly, entry of the instant Amendment, as an earnest attempt to advance prosecution and reduce the number of issues, is requested under 37 CFR 1.116.

Favorable reconsideration, withdrawal of the rejection is set forth in the above-noted Office Action and an early Notice of Allowance are also requested.

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Respectfully submitted,



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